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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,853	11/13/2003	Alec Duling	ASC-22	4890
28230	7590	10/06/2005	EXAMINER	
H JAY SPIEGEL P.O. BOX 444 MOUNT VERNON, VA 22121			NGUYEN, SANG H	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/705,853

Applicant(s)

DULING ET AL.

Examiner

Sang Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19 and 20 is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☒ Claim(s) 2-18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Oath/Declaration***

The Oath/Declaration filed on 11/13/03 is acceptable.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto (U.S. Patent No. 4,874,937) in view of Reymond et al (U.S. Patent No. 4,314,761).**

**Regarding claim 1;** Okamoto teaches a sensor considered to be a sun sensor (figure 6 and abstract) for determining angular position ( $\theta$  of figure 6 as indicate an incidence angle of sunbeam SB and col.3 lines 54-56) of a radiating source (SB of figure 6) in two dimensions (figure 3), comprising:

a radiation sunbeam source of light (SB of figure 6) located in a prescribed space (SB of figure 6 as indicate to on a rectangular prism 31);

a light detector considered to be a CCD linear array sensor (45 of figure 6) adjacent said space (figure 6);

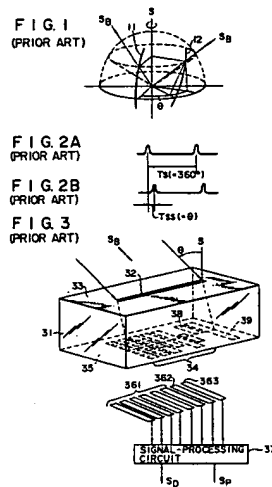
a two dimensional mask considered to be an opaque film (41 of figures 4 and 6) formed on the upper surface of the rectangular prism (43 of figures 4 and 6), wherein the two dimensional mask (41, 43 of figure 6) disposed between the CCD linear array

sensor (45 of figure 6) and the sunbeam of the light source (SB of figure 6). See figures 4-11.

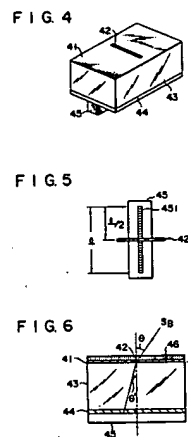
Okamoto discloses all of features of claimed invention except for the mask having a two dimensional surface pattern formed thereon by a prescribed pattern of frequencies, whereby light from said source travels through said mask and onto said detector, said surface pattern causing at least one of phase or frequency changes to occur, said changes being used to calculate angular position of said source of light with respect to said detector in two dimensions. However, the Prior Art of Okamoto teaches at figures 1-3, that it is known in the art to provide a mask considered to be a rectangular prism (31 of figure 3) having two surface opaque films (33, 35 of figure 3), wherein said surface opaque film mask (35 of figure 3) having a two-dimensional surface pattern (figure 3) formed thereon by a prescribed pattern of frequencies (34, 38, 39 of figure 3 and col.1 line 50 to col.2 line 3), whereby light from said source (SB of figure 1) travels through said mask (35 of figure 3) and onto said detector (361, 362, 363 of figure 3), said two-dimensional surface pattern of the mask (35 of figure 3) causing at least one of frequency (or period) or phase difference pattern (Tss of figure 2) changes to occur respect to the cycle pulse signal (Ts of figure 2, it is considered to be the frequency is  $1/\text{period}$ , wherein the period is a cycle), said changes being used to calculate angular position of said source of light with respect to said CCD array sensor (361, 362, 363 of figure 3 and col.1 lines 25-35) in two dimensions. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a sun sensor of Okamoto with the mask having a two dimensional

surface pattern formed thereon by a prescribed pattern of frequencies, whereby light from said source travels through said mask and onto said detector, said surface pattern causing at least one of phase or frequency changes to occur, said changes being used to calculate angular position of said source of light with respect to said detector in two dimensions as taught by The Prior Art of Okamoto (figures 1-3) for the purpose of raising measuring accurately angle of sunbeam by applying additional Gray-code pattern on the mask (col.2 lines 21-30).

U.S. Patent Oct. 17, 1989 Sheet 1 of 5 4,874,937



U.S. Patent Oct. 17, 1989 Sheet 2 of 5 4,874,937



Okamoto discloses all of features of claimed invention except for a point light source. However, Reymond et al teaches that it is known the art to provide a radiation sensor (figure 1 and abstract) comprises a point light source (S1 of figure 1), a slit mask (1, 3 of figure 1), a linear strip photodetectors (2 of figure 1), and a processing circuit (4 of figure 1) and a computer (5 of figure 1) for determining the angular location of point

source (col.2 lines 55-58). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a sun sensor of Okamoto with a point light source as taught by Reymond et al for the purpose of computing accurately circuits process data relating to the angular displacement of radiation source (col.1 lines 31033) and the probability of direct detection of solar radiation is high attenuated (col.5 lines 29-30).

***Allowable Subject Matter***

**Claims 2-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.**

The prior art of record, taken alone or in combination, fails discloses or render obvious a sensor for determining angular position of a radiation point source comprising all the specific elements with the specific combination including of surface pattern of the mask includes at least one series of frequencies extending along a line consisting of at least one low frequency, at least one variable frequency, and at least one high frequency in set forth limitation of claim 2.

**Claims 19-20 are allowed.**

The following is a statement of reasons for the indication of allowable subject matter:

As to independent claim 19 is allowable over the prior art for at least the reason that the prior art of record, taken alone or in combination, fails discloses or render obvious a sensor for determining angular position of a radiation point source comprising

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all the specific elements with the specific combination including of the frequency pattern of the mask comprising first and second orthogonal lines, each of said lines having a series of frequencies thereon consisting of at least one low frequency, at least one variable frequency, and at least one high frequency in combination with the rest of the limitation of claim 19.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Rieger (6274862) discloses arrangement for determining the incidence angle of radiation; Ma (5757478) discloses remote position sensing apparatus and method; Ogawa (5499098) discloses optical position detecting unit; Sugiura et al (5483060) discloses optical position sensor; Okamoto (4999483) discloses sensor for detecting two dimensional angle of incidence of the sun; Dunavan (4857721) discloses optical direction sensor having gray code mask; Tsuno et al (4810870) discloses sun sensor with period pattern reticle; Auner (4794245) discloses position sensor; or Ellis (4092072) discloses optical sensors.

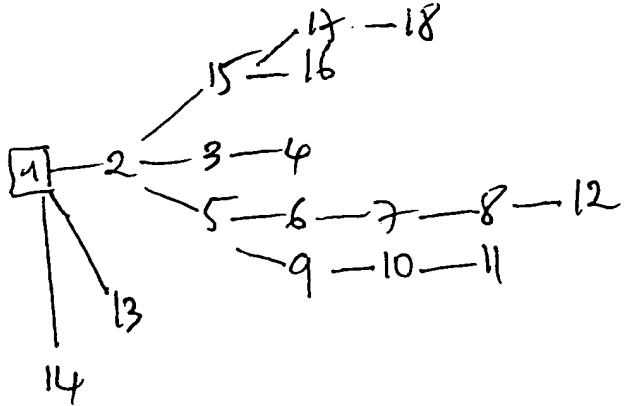
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

September 19, 2005

  
**Patent Examiner**  
**Sang Nguyen**  
**Art Unit 2877**



19-20

